What determines Internet diffusion loci in developing countries: Evidence from China and India

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Abstract

This paper examines the current stages of Internet and e-commerce development in China and India. Although China exceeds or equals India in several dimensions of Internet diffusion used in this and past studies, the Economist Intelligence Unit (EIU) puts India in the group of "E-business followers" and China in the group of "E-business laggards". These seemingly inconsistent facts are investigated deeply. The analysis indicates that influence of Marxist labor theory and the Post-Mao reform in China resulted in self-dependence in IT products and heavy investment in and reengineering of telecom sector, which mainly contributed to China's better performance in Internet penetration. India's democratic tradition, English language advantage and recent liberalization, on the other hand, make it better prepared for the e-business. A causal model is also proposed to explain Internet diffusion in developing countries.

Keywords: People's Republic of China, India, Internet, innovation diffusion, historical methods

Introduction

Internet is diffusing rapidly in the two Asian giants-- People's Republic of China (hereinafter: China) and India. Each are estimated to have more Internet users than in the U.S. by 2010 (Nua Internet Surveys 1999). A comparison of Internet diffusion paths in the two countries reveals an interesting pattern. India was connected much earlier to the Internet than China. India established, ERNET, the first Internet network, in 1986, had an IP connection with UUnet Technologies in the U.S. in 1989 (Burkhart et al 1998) and was connected to the US National Science Foundation Net (NSFNET) in 1990 (Goldstein 2000). Although email link with CSNET protocols was established between Germany and China in 1987 (Goldstein 2000), Internet connectivity in China started only in 1993 (Burkhart et al 1998). By 1994, only one year after China was connected to the Internet, it had almost twice as many Internet hosts and 3.5 times as many Internet users as in India (International Marketing Data and Statistics 2001).

Past studies comparing Internet and e-commerce development in China and India have arrived at seemingly inconsistent findings. Press et al. (1999) analyzed Internet diffusion in China and India in terms of six dimensions-- pervasiveness, geographic dispersion, sectoral absorption, connectivity infrastructure, organizational infrastructure and sophistication of use-- and found that China exceeded or at least equaled India on each dimension. However, in terms of the Economist Intelligence Unit's (EIU) "E-readiness" ranking, India is ahead of China (Ebusineeforum.com 2001b). The E-readiness ranks of India and China were 50 and 51 out of the 60 main economies studied by the EIU in 2000. In 2001, India's new rank of 45

takes it in the group of "E-business followers" such as Greece, Czech Republic and Hungary. China's new rank of 49 in 2001, on the other hand, puts it in the group of "E-business laggards" such as Kazakhstan, Vietnam, Azerbaijan and Pakistan.

This study is an attempt to investigate deeply the seemingly inconsistent findings mentioned above. It proposes a causal model with three levels of causes to explain Internet diffusion in the two countries--deep structural causes (having origins far removed in time), contextual causes (having more proximity in temporal relationship with the focal event) and triggering causes (closest in time to the focal event")[1] (Smith and Lux 1993). In doing so, this paper also responds to calls for research dealing with width and depth of innovation adoption (Gatignon and Robertson 1991), spatial dimension and multi-country studies (Mahajan et al 1990) and the way how people incorporate the Internet into their lives and which of their previous activities are substituted or complemented with Internet use (Hargittai 1999).

The remainder of the paper is organized as follows. The following section compares the current stages of Internet diffusion in Mainland China and India. Next, methodology used is discussed. It is followed by an examination of the factors influencing Internet diffusion loci in the two countries. Finally, we revisit current stages of Internet development in China and India and provide some conclusions.

Internet diffusion stages in China and India

Table 1 provides some indicators related to the current stages of Internet diffusion in the two countries in terms of level, pattern, width, depth and integration in existing ways of lives.

Level of diffusion: Although the Internet is just beginning to take off in both countries, China is ahead of India in terms of the number of hosts, number of users and total e-commerce transactions. By the end of 2000, 1.8% of the Chinese population used the Internet compared to 1% in India. Even in the urban areas of both countries, at least one in four people haven't yet heard of the Internet (Nua Internet Surveys 2001b).

Pattern of diffusion: Diffusion patterns in terms of the distribution of Internet users according to geographical areas, age groups, genders, educational attainment; occupations, etc are comparable in both

[1] The focal events in this study are the diffusion of the Internet in China and India at the current stages.

countries. As shown in Table 1, Internet users in both countries are mainly located in major cities, much richer and educated than the average population, young, males and more so in India than in China. 98 % of Indian Internet traffic originated from six major gateway cities in 1998 (Press et al 1999) whereas top six cities in China accounted for about 45% of the traffic in 2000 (CNNIC 2001).

Width and depth of adoption: Widths of Internet adoption measured by the number of its different uses are comparable in the two countries. In both countries internet is mainly used for receiving and sending email, searching information, getting news, investing online, purchasing goods and services, etc. Depth of Internet adoption to purchase online-- represented by the total e-commerce or e-commerce per Internet user-- is much higher in China than in India. Similarly, measured by the total Internet usage per week, Internet adoption in China is much deeper (13.66 hours) than in India (1.73 hours).

Table 1 About Here

Integration of the Internet in existing ways of lives: In both countries, email is the most frequently used function. Internet is thus stimulating new communications as well as replacing the mail communication. Chinese are more likely to use the Internet for software downloading and uploading than Indians and reverse is the case for using the Internet to send fax (Table 1). Similarly, significantly higher proportion of users (10.9%) (CNNIC 2001) trade stock online in China than in India (1.9%) (Nua Internet Surveys 2000). In China, 13% of the users shopped online in 2000 (CNNIC 2001) whereas, during the same period, 10 % shopped for books and CDs, 6 % for daily items like food and 3 % for cars, appliances and computers in India (Venkatesh 2000). In both countries, a large proportion of transactions are conducted on a cash basis. In China, for instance, 42% of the online transactions were conducted in "cash on delivery" basis in 2000 (CNNIC 2001). Whereas virtually all users in India access the Internet by using PCs, about a million of Chinese users accessed the Internet by using other equipment such as mobile terminals and information electrical appliance in 2000 (CNNIC 2001).

Methodology

This paper uses historical methods to examine the forces influencing Internet diffusion in China and India. Historical methods entail asking open-ended questions about past events and answering them with

selected facts arranged in the form of an explanatory paradigm (Fischer 1970). The question addressed in this paper is: What factors are driving Internet and e-commerce development loci in China and India? An explanatory paradigm is constructed to answer the question, which helps understand the factors causing the differences in the Internet and e-commerce development paths in the two countries. Pertinent facts were collected from several published and unpublished sources. Then a selection process narrowed down from whatever is available to those appropriate to the question (Smith and Lux 19933). Adductive[2] reasoning is used to obtain an explanatory fit to the question and develop a causal model helps understand the forces shaping the diffusion of the Internet in the two countries. Knowledge resulted from making the current stages of diffusion understandable, in turn, will be useful in dealing with future problems (Fischer 1970).

Determinants of the Internet and E-commerce development loci

In order to answer the above question, literature search was conducted. Several forces identified to have influence on the diffusion of the Internet and e-commerce in China and India are presented in Figure 1.

Figure 1 About Here

Why Internet penetration is higher in China: some triggering causes

First, China's per capita GDP is higher. Second, China manufactures higher proportions computers and other IT products domestically than India. It has popular brand names such as *Legend.* Unbranded computers customized and assembled by local shops and typically priced 25% lower than branded models are estimated to hold about 50 % of the market (Torrens 2000). Third, although Internet access charges declined significantly in both countries in the past two years, China has cheaper rates than India (Table 2). Fourth, the total international bandwidth available in China is much larger than in India (Table 2). By the end of 2000, China had direct connection to the U.S., Canada, Australia, Britain, Germany, France, Japan, South Korea, etc (CNNIC 2001). Fifth, China had explicit national initiative to develop high-speed data networks whereas India took a market-driven, piecemeal approach to infrastructure development, with VSNL competing against private ISPs (Lovelock 1996). China launched its version of national

[2] Fisher defines adduction as the combination of induction (which shows that something *actually is*) and abduction (which suggests that something *may be*).

information infrastructure (NII), known as the "Golden Projects" in response to similar initiatives in the developed countries (Tan et al 1997). Sixth, China has a higher literacy rate. Seventh, the development of more local language content is spurring the growth of Internet users in China. Whereas India has more than 500 local dialects, Chinese population is more homogeneous. An estimate suggests that by 2003, the majority of web content will be in non-English, Chinese being the major one (Lincoln 2001). In 2000, 78% Chinese users viewed Chinese language Information and 71% viewed domestic information (CNNIC 2001).

Table 2 About Here

Deep structural and contextual causes

Political and regulatory factors

Influence of Marxist theory in China resulted in the self-dependence in most IT products. Then, the post-Mao leadership initiated a major reform to facilitate the diffusion of technology and endorsed the concept of “technology as a commodity”, which led to the formation of a large number of research institutes including more than 5,000 state-operated research units employing more than 230,000 scientists by 1987 (Baark 1988). The transfer of technology from state operated research units to industrial enterprises fueled rapid technological change. The reform also resulted in market openness for foreign direct investment (FDI) in China. The FDI inflow in China averaged $11.7 billion per year during 1985-95 and $42 billion per year during 1996-99 (24% of the total FDI inflow in developing countries) which compare with India's 0.45 billion and 2.7 billion respectively in the two periods (UNCTAD 2000). By 2000, China attracted about $150 million foreign investment into its dotcom companies (Torrens 2000).

China invested heavily in telecom sector in the 1980s and 1990s. When there were signs of inflation in the economy in the early 1990s, China placed limits on new capital investment programs in other sectors of the economy, but the telecommunications sector was exempted from the growth freeze. The Chinese government is counting on the new economy to burnish its image at home and abroad (Ebusinessforum.com 2000) and has formulated a series of programs to develop the telecom sector including extensive government re-engineering (James 2001). China Unicorn, formed in 1994 to compete

with the then-monopoly China Telecom, is licensed for mobile, paging, data, Internet and long-distance with an international gateway and access to China Telecom's local-loop connection to the fixed line customers (James 2001). China Unicorn and China Mobile are already in a price war (Wilhelm 2000). Also these two and a number of ISPs and ICPs have been forced to adapt to the rigorous disclosure requirements of the New York Stock Exchange and NASDAQ (McDaniels and Waterman 2000).

The 1976 law limiting foreign investment to 40% was a severe blow to India's IT development. Former Prime Minister Rajiv Gandhi had identified IT as a "core sector", but his assassination in 1985 had an unfavorable impact on India's IT development. For many years, India resisted global trend of privatization and competition in telecom sector. Although the economic reforms were started in 1994, weak political leadership and unstable government proved to be major obstacles. Internet was not open to private subscribers until 1995 and private companies were not allowed to provide Internet services until 1998 (James 2000). India's many positive attributes--a well-developed private sector and the entrepreneurship of its domestic corporations, democratic traditions, a developed and transparent legal system with a constitution written in English (Josiam et al 1999), 250 million strong middle class market segment aware of global brands, large English speaking work force, etc- could not work in the absence of appropriate government policy.

The BJP government, recognizing the role of IT, set up a high-powered IT task force in May 1998 to make India a Global IT Superpower (Jhunjhunwala 2001). One of the major recommendations of the task force was to end the government monopoly as the ISP. Accordingly, among other measures, India privatized the national long-distance market, permitted ISPs to set up their own submarine cable landing stations and share bandwidth with other ISP, allowed the use of Ku-band in both Indian and foreign satellites to liberalize telecom sector. It also enacted laws to protect intellectual property rights. India has formal legislation to recognize digital signatures whereas China does not. India also lowered import duties on IT products from 110% to an average of 20% (Sowinski 1999). Already many positive signs have started appearing. MNCs such as Hewlett-Packard and Texas Instruments have already arrived in India.

Nortel and Cisco are setting up R&D centers there. MNCs which left in the1970s, such as IBM and Coca Cola, are also back with multi-million dollar investments. India is also developing many hi-tech districts.

During mid-2000 to mid-2002, an estimated $5 billion investment is expected in building new fiber-optic systems in India (Erickson 2000). MNCs such as Lucent Technologies and Airtel are laying fiber-optic lines. In October 2000, Singapore Telecom announced an eight-terabit cable connection between Singapore and India (Lynch 2001). Likewise, VSNL, the State owned Telephone Company, which listed on the New York Stock exchange in the mid-2000, has proposed to increase its capacity to 13 gigabits by 2004 (Erickson 2000). These factors are likely to bring bandwidth boom in India.

Education and other cultural factors

Attitude towards using a technology is influenced by perceived usefulness (PU) and perceived ease of use (PEU) of the technology (Davis 1989). PE and PEU, on the other hand, are influenced by the existence of skills required to use the technology. English language is one of such skills in the case of Internet adoption as a large proportion of contents on the WWW are in English (Nunberg 2000) and most of the human-computer interface (Hedley 1999) and the bulk of software used in the Internet favor English language users. India's 50 million fluent English speaking people give it an edge in Internet use.

India’s another advantage is its expertise in software development. About 1,832 educational institutions train more than 124,000 engineers every year and 68,000 of them are computer software professionals (James 2000; Whelan 2000). Of the top 49 software development facilities in the world rated at Level 5, the highest level on the process maturity scale established by Carnegie Mellon University, 24 are in India (Economist 2001). Software export from India increased from $20 million in 1989 to $5 billion in 1999 and is expected to reach $30 billion by 2004 (Cusumano 2000; Whelan 2000). India exported software to more than 86 countries in 1999. About one-fifth of the Fortune 1000 companies have been sourcing software from India. Indian coders wrote many of the popular software applications such as Netscape and Microsoft Hotmail fully or in part (Hattori 2000). It is believed that the culture, language and education systems in India make students competent in areas like math and computer code writing.

Still another advantage of India is the extensive network of contacts created by its community of expatriates working and studying in the U.S. and other developed countries. While overseas Chinese are mostly manufacturers, traders, and exporters, Indians living abroad are professionals (Kapur and Ramamurti 2001). Thanks to the network created by more than 32,000 Indian medical professionals, a large number of U.S. hospital are sending the dictation by their doctors to convert into written medical records (Dhume 1999).

India's major cultural obstacles include a stifling bureaucracy and illiteracy in excess of 40 percent of the population. Moreover, for more than 950 million Indians, the lack of Indian language interfaces is hampering Internet adoption (Venkatesh 2001).

Technological development

Prices of IT products, storage and transmission costs have reduced sharply. Thanks to reduced transmission costs, programmers from Banglore to Beijing can work with other programmers located in the U.S. Innovations in mobile pricing such as mobile pre-paid cards are also facilitating the rapid diffusion of mobile sets. An increasing proportion of users in China are accessing the Internet by using mobile sets. Another development is the availability of user-friendly software such as Linux. Linux is helping linguistic groups of smaller size, especially those in India, which don’t understand English or otherwise are unattractive for marketers (Venkatesh 2001).

Improved telecommunications and the Internet allow more and more white-collar tasks to be performed remotely. India's vast pool of English-speaking and computer-literate workers are joining the Third World information-technology labor force created by the development in technology. Indian teleworkers are more educated than their American counterparts in similar jobs and treat them as serious careers and hence tend to perform better (Ebusinessforum.com 2001a). A study of Political and Economic Risk Consultancy, a Hong Kong based organization, in a comparison of compared thirteen Asian countries in terms of quality, cost and availability of skilled labor ranked India at the top. By 1999, 23,000 Indians employed by White-collar factories run by multinationals such as GE Capital, British Airways, Swiss Air and American Express generated about $225 million in annual revenues (Dhume 1999). An

estimate suggests that global IT services will amount to $142 billion by 2008 (Kremmer 2001) and employ 1.1 million Indian white-collar workers generating nearly $19 billion in annual revenues by that time (Dhume 1999). Michael Dertouzos of MIT points out: If India's some 50 million English-speakers earn $20,000 a year doing “office work proffered across space and time”, they will make a total of $1 trillion, twice India’s current GDP (Ebusinessforum.com 2001).

International and global forces

International agencies are also facilitating Internet diffusion in developing countries. ERNET, the first Internet network in India, was established with assistance from the UN Development Program (UNDP) (Burkhart et al 1998). Likewise, the United Nations Conference on Trade and Development (UNCTAD) trade points are making the Internet available to SMEs, which otherwise are not able to manage the cost of acquiring the Internet. Many SMEs in China and India have already benefited from the services provided by the UNCTAD trade points. Similarly, the World Trade Organization (WTO) is influencing Internet development in developing countries by increasing the competition and reducing the prices of IT products and services. India signed information technology agreement (ITA) under the WTO and committed to eliminate tariff to a wide range of IT products by 2005 (Bhatnagar 1999). Under the GATS agreement of the WTO, India committed to open its fixed telephone services to competition immediately. To get WTO membership, China committed to permit foreign telecom service suppliers to establish joint ventures without quantitative restrictions in several cities with up to 25% foreign investment. Within three years, foreign investment limit will be increased to 49% and there will be no geographic restrictions within five years. China has shown willingness to participate in the ITA and eliminate tariffs on products such as computers, semiconductors, and telecommunications equipment (Wang 2000).

Other factors

China and India are the largest and second largest countries in the world in terms of population sizes. Both countries have been attractive destinations for FDI because of their billion plus markets and strong middle class. Income inequality as measured by gini coefficient (Table 2) is slightly higher in China than in India. Higher income inequality is favorable in the initial phase of Internet diffusion but tends to be

unfavorable in the later phase. The Internet is a distant hope for more than 70% of the people living in the rural areas of both countries.

Consequences of Internet adoption its impact on government regulation

While the governments of both countries are aware of the economic benefits of the Internet, they are also concerned about its negative impact on national security, social values and their right to rule. Contextual events such as the negative role of the mass media during the Tiananman Square demonstrations and the fall of the Soviet Union heightened Chinese governments concern on the uncontrolled flow of information on the Internet. China has only one guarded gateway to the WWW. Internet users cannot access a range of foreign web sites. Domestic web sites are censored at the source through a registration process and content monitoring (Torrens 2000).

We can find several instances of Internet control in China. They include shutting down the Web site of New Culture Forum in the accusation of posting "counter-revolutionary content" (Yang 2001), ban on the discussion of “state secrets” on the Internet (Fang 2000), requirement for companies to reveal the type of encryption software used as well as the name, phone number, and E-mail address of employees using it (Fang 2000), etc. Its activities to control the Internet earned the Chinese government the distinction of being one of the top 20 enemies of the Internet in 1999 (Yang 2001). In fact, the revolutionary nature of the Internet and Chinese “national security” concerns led the Chinese government to promote technological development loudly and focus its attention on the Internet before India did which accelerated the growth (Press et al 1999; Yang 2001).

India, often described as the largest democracy of the world, is less concerned about the political impact of the Internet. It has, however, taken measures to control the Internet. A report by the Electronic Privacy Information Center (EPIC) discusses Indian government's efforts to compel users to disclose keys or decrypted files to government agencies (Gips 2000). Also, India’s IT Bill has a special section on offences dealing with the publication or transmission of “obscene material” (Achar 2000).

Internet and E-commerce in China and India: revisited

Several factors (Table 3) give China an edge in Internet development and explain its superiority over India in terms of pervasiveness, geographical dispersion, sectoral absorption, connectivity infrastructure, sophistication of use, width and depth of adoption, etc. The EIU's e-readiness ranking takes such factors as connectivity, business environment (over the next five years), e-commerce consumer and business adoption, legal and regulatory environment, supporting e-services and social and cultural infrastructure. India's overall performance in these dimensions is better because of its legal support for virtual transactions and digital signatures, well-developed private sector and entrepreneurship, the regulatory environment including taxation, and openness to trade and investment, etc (Table 3). This is exactly why India is better prepared for e-business than china, at least in the eyes of the EIU. These factors have also led some companies to develop special programs focusing on India. Lucent Technologies, for example, has implemented an India-specific strategy named "India Focus Program" (Pai 2001) since India is also the fastest growing market for telecom equipment in Asia.

Table 3 About Here

Discussion and Conclusion

Factors such as larger market, higher per capita GDP, self-dependence on IT products, well-developed data network, and higher international bandwidth make Chinese market more attractive for several e-commerce applications. Since the penetration rates of mobile and broadband technologies in China are much higher than that can be explained by the difference in income levels of the two countries, e-commerce applications based on such technologies are likely to be more successful in China. In particular, China has a bigger market for applications such as stock trading and financial transactions. China's recent entry in the WTO has further increased its telecom and Internet development potential. However, unlike India, China does not yet have formal laws to govern e-commerce transactions and companies have to rely on conventional laws in case of disputes.

Availability of 50 million intelligent English speaking workforce at cheaper rate, a large proportion of that being computer literate, make India an attractive place for outsourcing white-collar workers. Companies located in developed countries can significantly reduce their operating costs by

employing Indian teleworkers in less critical steps of the value chain such as back-office services as well as in higher value-added services such as design and engineering and education (Kapur and Ramamurti 2001). The upcoming bandwidth boom in India will further increase the teleworking potential by enhancing the quality of telecom services.

In both countries, the Internet is beyond imagination in the near future for more than 70% of the population living in rural areas. Companies that are able to design ICT products, possibly by collaborating with the governments, to serve the needs of the rural people in the two countries can reap immense benefit.

Since a large proportion of Chinese view information written in Chinese language, the best way to target Chinese Internet users is to provide content in Chinese language. Whereas about 50 million of Indians are fluent in English, remaining 950 million speak more than 500 different local dialects and the success of a company is a function of its ability to identify the linguistic segments that can be served profitably.

Unlike in western countries, most of the transactions in China and India are conducted on cash basis and thus e-commerce companies are required to provide alternatives such as cash on delivery, wire transfers and checks to facilitate e-commerce. "Obscene" materials have no markets in both countries. In addition, "politically objectionable" content is highly controlled in China.

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Figure 1: A causal model to explain Internet diffusion in developing countries

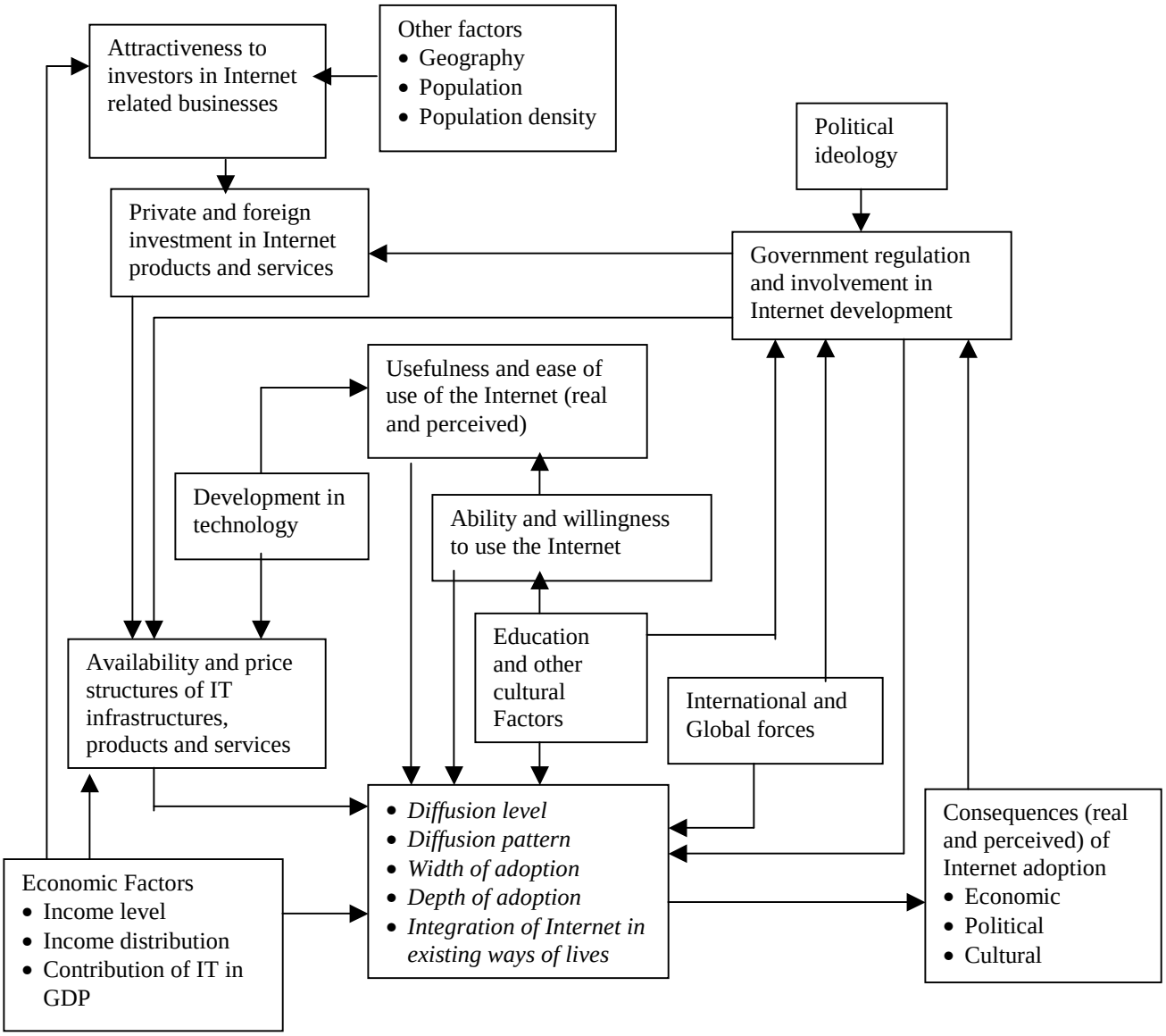

Table 1: A comparison of Internet and e-commerce development in China and India

	China	India
E-readiness rank (out of 60 economies)		
2000	51	50
2001	49	45
Number of Internet hosts		
1993	-	138
1994	569	359
1999	25882	24518
Per 10,000 people (Jan. 2000)	0.57	0.23
Number of Internet users		
1993	2,000	2,000
1994	14000	4,000
2000 (end)	22.5 million	10 million
Per 100 people (2000 end)	1.83	1.0
No. of ISDN subscriber (1999)	258000	24518
[c] **Electronic commerce**		
1999	$13 million	$ 2.2 million
2001 (forecast)	--	$23.6 million
Avg. Internet use per week	13.7 hr.	1.7 hr.
Educational attainment of Internet users (2000)		
High school or below	29%	15 %
College	30%	9%
Bachelor degree	39%	37%
Graduate/post graduate	2%	39%
Median monthly income range of Internet users/owners (2000)	RMB1001- 1500 ($121-181) (users)	Rs.15000-20000 ($327-437) (owners)
Gender distribution of Internet users (2000)		
Male	70 %	77 %
Female	30%	23%
Age distribution of Internet users (2000)		
Under 24	56%	61%
25-39	35%	28%
Over 40	9%	11%
Proportion of Internet users in top 6 cities	98 % (1998)	45 % (2000)
Main uses of the Internet (2000)	Email (95%) Search engines (67 %) Software downloads (51%) Information collection (45%) Chat (38%) Newsgroups (19%)	Email to friends (83%) Reading news (62 %) Work related email (60 %) Chat (49 %) Sports information (48 %) Sending faxes (40%)
Means to access the Internet		
Dial up access	84%	97%
Direct access	16%	3% (cable)

Source: Boston Consulting Group (www.bcg.com), CNNIC (2001), E-Marketer (2001), International Marketing data and Statistics (2001), Nua Internet Surveys (2001a), The World Bank (2001), Venkatesh (2000), www.ebusinessforum.com

Table 2: A comparison of China and India in terms of indicators influencing Internet and e-commerce development

Indicator	China	India
GDP level, composition, distribution and investment		
GNP per capita ($1999)	780	450
GNP ($, Purchasing Power Parity)	3291	2149
Investment in telecommunication infrastructures (billion $, 1999)	23.5	3.0
High technology exports as percentage of total exports	15	5
Gini coefficient	40.3	37.8
Share of income of poorest 10 % population	2.4%	3.5%
Share of income of richest 10 % population	30.4%	33.5%
Education		
Male literacy rate (%, 1998)	91	67
Female literacy rate (%, 1998)	75	43
Scientists and Engineers in R&D (per million, 1987-97)	454	149
Penetration of other ICT products		
Fixed telephone per 1000 people 1998	70	22
Mobile telephone per 1000 people 1998	19	1
Television sets per 1000 people 1998	272	69
Personal computer per 1000 people 1998	8.9	2.7
Competition and Infrastructure		
Total International Bandwidth (MB, 2000)	2799	350
Number of ISPs, 2000	> 100	315
Average Internet access charge ($ per hour, 2000)	0.48	0.62
Population (Million, 1999)	1250	998

Source: The World Bank (2001), Torrens (2000), www.ebusinessforum.com,

Table 3: Relative advantages and disadvantages of China and India in Internet Development

	Relative advantage	Relative disadvantage
China	• Higher per capita GDP • Higher investment in telecommunications sector resulting in higher tele-density • Higher international bandwidth • Self-dependent in most IT products • Cheaper Internet access rates	• No e-commerce and digital signature laws • Control on Internet content
India	• Well developed private sector and entrepreneurship of its domestic corporations and conglomerates • Democratic tradition and transparent legal system • Large middle class aware of global brand • Large English speaking work force • Extensive networks of contacts created by expatriates • World leader in software development	• Weak political leadership • Stifling bureaucracy and red tape • Higher illiteracy rate • Many languages